EXPLORING THE LINKAGES BETWEEN GREEN MICROFINANCE AND RURAL ECONOMY TOWARDS THE SUSTAINABLE DEVELOPMENT

SYNOPSIS

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1. INTRODUCTION

"Green is a process, not a status. We need to think of 'green' as a verb, not an adjective."

-Daniel Goleman

Microfinance Institutions have existed for generations as a way to empower and offer possibilities to low-income people, from the European Credit Trade unions of the 19th century to the Microfinance services movement championed by visionaries like Muhammad Yunus and Al Whittaker. These microfinance institutions now concentrate more on sustainability concerns than merely alleviating poverty, having changed their focus over time. Both social and environmental aspects are now included in the scope of microfinance, and these organizations have effective vehicles for promoting sustainable development.

The phrase "Microfinance" means financial assistance to low-income groups. The revolutionary Grameen Bank, established by Muhammad Yunus in the 1970s, is a key inspiration for the present use of the term "microfinancing," which is often used in this context.

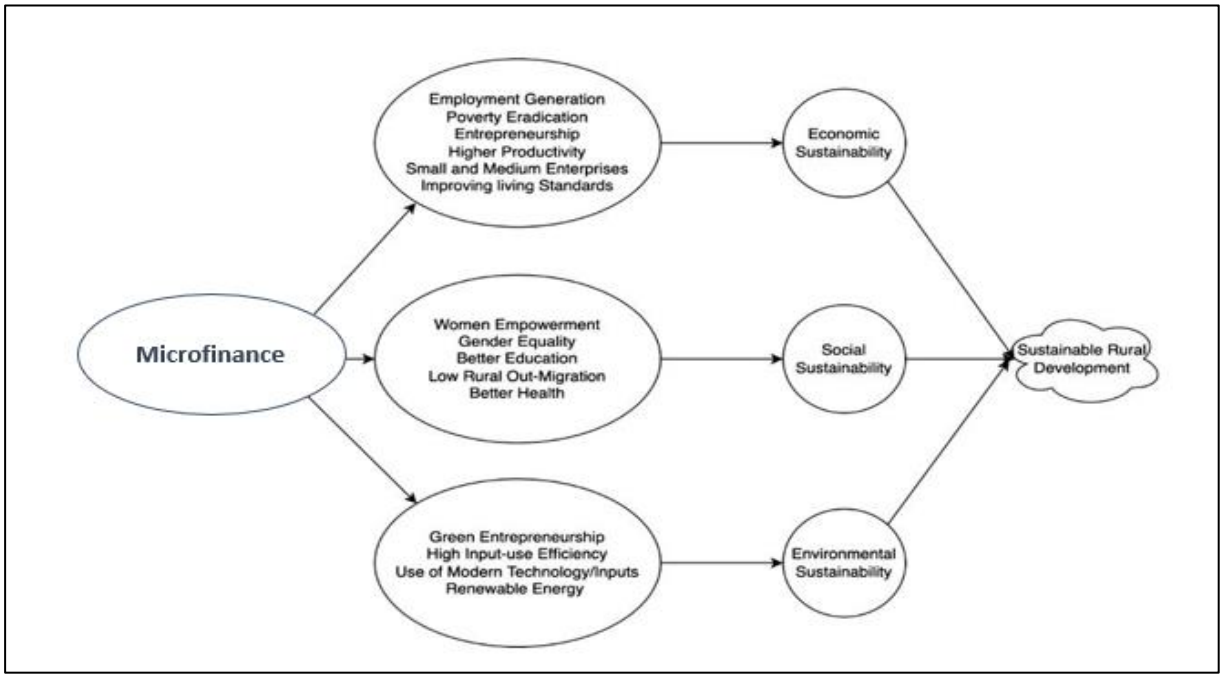

Figure 1: Relationship between Microcredit and Sustainable rural development *(Imran et al., 2022)*

It has become essential to adapt to and reduce pollution, waste, and climate change in rural areas. So, there is a need to include an environmental dimension in microfinance which is known as “green microfinance” or “microfinance plus," is a straightforward concept with enormous potential. It involves

utilising the network and knowledge of Microfinance Institutions (MFIs) to make it easier for the underprivileged to access cutting-edge goods and services that address their basic needs. Green microfinance thus emerges as an effort to augment micro-financed goods and services with targeted pro-poor climate-change tactics to increase the adaptive ability of thousands of microfinance clients globally in a priori unfamiliar environment.

Microfinance institutions must take a proactive stance toward climate change if they hope to secure and safeguard their resources and their clients from the challenges brought on by a changing environment over the long term. For Microfinance institutions to be able to endure environmental/weather risks when weather conditions increase, it is essential to have climate-proof microfinance products. While microfinance organisations have historically contributed to sustainable development primarily via their financial and social goals, green microfinance takes things a step further by adding a third goal centred on environmental sustainability.

Although "economic" has always been the major goal of microfinance, in recent years "social" or "developmental" goals have taken centre stage. In addition to these conventional goals, microfinance scholars now claim that a third sustainability goal has taken centre stage. By giving low- or moderate-income people loans and technical support to enable them to buy and set up "green" or environmentally friendly items and technologies, "green microfinance" aims to achieve these goals. In Asia, microbusinesses are exceedingly common; according to the Asian Development Bank, they make up more than 60% of all businesses and 50% of all paid jobs.

1.1 GREEN MICROFINANCE

Green microfinance institutions (MFIs) offer lenient loans to people or organisations whose efforts advance green jobs, sustainable economic growth, and environmental solutions. Microfinance green approach includes institutionalized environmental impact activities, positive portfolios, and non-hazardous policies. Producing green goods or services is a component of microfinance institutions' sustainability. Concern for the environment is a key component of green microfinance institutions (MFIs), and they have an eco-friendly component. Green MFIs promote women's participation in the economy through advancing renewable energy. After all, environmental goals and gender equality are inextricably intertwined more productive people can afford to do so, and the resulting economic growth

makes it easier for rural microfinance institutions (MFIs) to expand.

"Green Microfinance" can support environmental preservation and energy efficiency while assisting in the reduction of issues like poverty and financial exclusion. Due in major part to the rising number of people who utilise microfinance institutions (MFIs) for loans, green microfinance may have a significant environmental impact. Additionally, the majority of low-income people that utilise microfinance rely heavily on the consumption of natural resources, which hastens their decline. These low-income groups may use "Green Microfinance" to guarantee that this degradation is significantly decreased and that their activities become sustainable. Thus, it is clear from the above that "Green Microfinance" offers many benefits to microfinance institutions (MFIs) themselves in addition to their customers and mankind at large.

The "Green Microfinance" is still in its infancy in India (Julia et al. 2016). there are several innovative green systems and partnerships ideal for boosting the quality of rural life and fostering sustainable livelihoods. At the micro level, green microfinance development and sustainable development must concentrate on a goal that takes into account issues with finance, society, the economy, and the environment. This encourages environmental development, energy efficiency, and the use of alternative energy sources. MFIs can implement and start Green MFIs to promote a green environment.

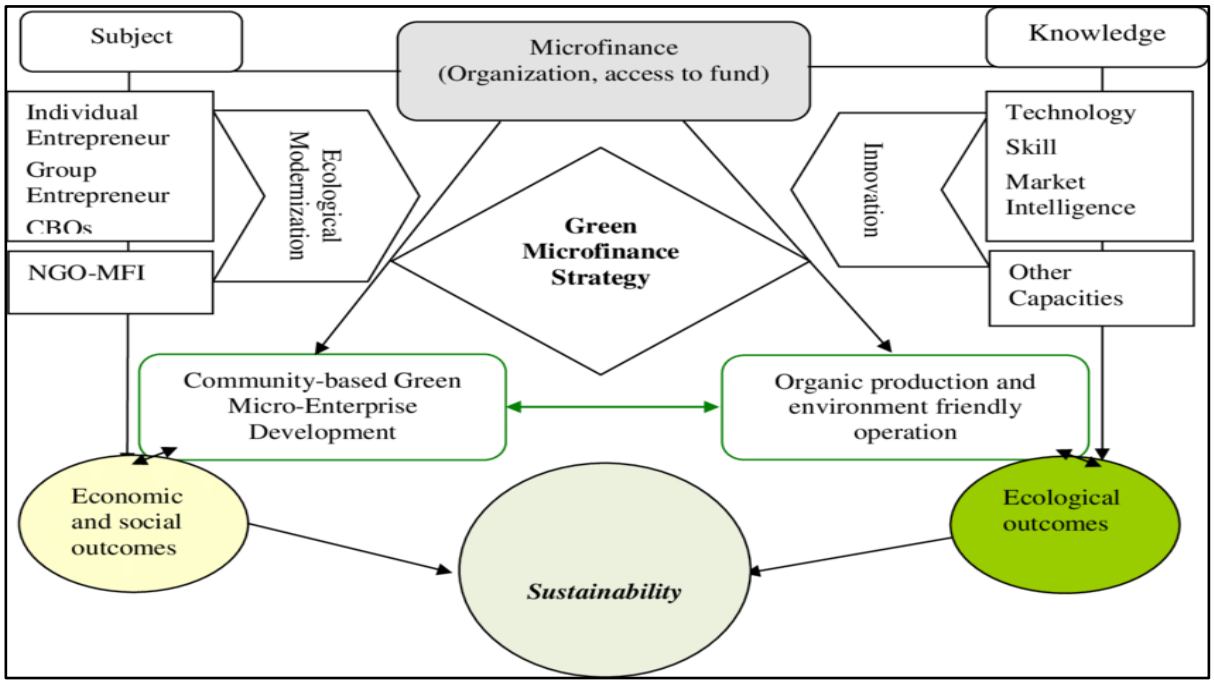

Figure 2: Conceptual Pattern of Green Microfinance *(Shahidullah, et al., 2015)*

1.2 MICROFINANCE FOR SUSTAINABLE RURAL DEVELOPMENT

The primary objectives of microfinance institutions are to provide the most vulnerable people in society with financial independence and to promote sustainable development through their activities. Practitioners and academics have approached Sustainable Development from several angles. From a micro-level perspective, organisational sustainability—which calls for a balance between the financial, social, environmental, and governance performance components in the short and long term—promotes sustainable development.

Given that microfinance may be used to connect with sustainable development, it is vital to take into account its multidimensionality, in which the financial, social, environmental, and governance components are incorporated, and recognize the necessity for equitable Sustainable development. The biggest challenges the present world witness the widespread poverty, low standards of living, and the consequent under population in rural areas. The rural population is 43.80% of the total world population but it is varying from country to country.

Especially in rural regions, microfinance has been extensively employed as a development tool. The goal of rural development is to raise the standard of living and the social and economic well-being of rural residents. Rural development and sustainable rural development are not similar. It also emphasises the state of rural environments and the capacity of coming generations to fulfil their requirements. Therefore, to promote local economies and urban-rural links, the everyday fundamental requirements of the rural people are met by appropriate public utilities together with technological, social, and environmental circumstances.

Regarding socioeconomic traits and other factors, rural and urban areas differ from one another. As a result, plans for rural development should differ from those for metropolitan regions. However, to attain welfare equality, efforts should be undertaken to reduce the disparities between the living conditions of the two regions. A rural region or rural development does not have a single, widely agreed-upon definition. Rural areas are defined as "*residential neighbourhoods where the economic system relies primarily on a biodiversity such as a forestry and agriculture where face-to-face communication is much more prevalent, where guidelines of everyday life are influenced by local belief systems, and where socioeconomic, financial, and institutional advancements are comparatively slow and postponed."*

Today's rural development focuses on enhancing all aspects of human existence, including economic, sociological, political, environmental, and bureaucratic challenges. Rural development has evolved beyond agricultural development to include environmental, societal, and human development. Therefore, there has been a recent transition from perhaps rural growth to sustainable rural development. The social, environmental, economic and political pillars provide the basis of sustainable rural development.

Sustainable rural development is crucial to the social, economic, and environmental sustainability of nations, according to a fact sheet on the 17th session of the United Nations Commission on Sustainable Development. Given that rural areas make up a large majority of the world's poor, it is crucial for ending poverty. Beyond the urban-rural split, poverty manifests itself in sub-regional and regional contexts. Therefore, it is crucial and very beneficial to coordinate rural development programmes that support sustainable livelihoods through initiatives at the international, local and national levels, as necessary. Rural development strategies should provide targeted, diverse methods and take into account the isolation and possibilities of rural regions.

The improvement of several indices, such as rising productivity, expanding job possibilities, high adoption of contemporary technology, reduced poverty, increased income, and sound infrastructure, among others, is what rural development is all about. Sustainable development does not merely concentrate on these issues without considering environmental circumstances. Rural regions' economic, social, and environmental sustainability is linked to sustainable development, which does not jeopardise the ability of the next generation to fulfil their requirements. Meeting your everyday requirements without sacrificing the social and economic welfare of the present generation of rural residents is the major goal of sustainable rural development, together with put emphasizing the security of coming generations without jeopardizing the quality of the environment.

2. REVIEW OF RELATED LITERATURE

(Summary Sheet: Annexure 1)

2.1 STUDIES RELATED TO GREEN MICROFINANCE AND RURAL ECONOMY

Microcredit Summit (1996) acknowledged that there is general agreement that microcredit has served as a new paradigm for rural economic development that has prioritised borrowers' capacity to attain

equitably (reduced gender inequality) and sustainable rural lifestyles as well as the survival of lending institutions. **Rahman (1996) and Hashemi et al. (1996)** identify the two main components of microcredit schemes are economic and social further they conclude that there is proof of the positive effects of microcredit in Bangladesh, including proof that it encourages impoverished households' investment in educating their children. **Littlefield et al. (2003)** analysed that borrowers' economic well-being has been documented through the review and evaluation of microfinance (MF) programmes, which have been supported by decreased vulnerability, improved income from varied and additional streams, enhanced savings, and consumption.

Ruben and Clercx (2003) identify that the addition to enhancing food security and facilitating income diversification, exposure to rural financing might also promote ecological preservation. The availability of microcredit, according to evidence from Bangladesh, promotes "asset building, creation of jobs, financial stability, and empowerment of the poor," particularly women **Chowdhury (2005)**.

Bonomo and Kirchstein (2010) revealed that the main strategy to combat poverty and achieve the MDGs has been possible through microcredit. **Uddin (2011)** acknowledged that the International Year of Microcredit was declared in 2005, and Dr Muhammad Yunus, as well as his Grameen Bank, received the Nobel Peace Prize further he highlighted the significance of microcredit as a tool for eradicating poverty and bringing about social change. The word "microfinance" describes the offering of financial products to customers with low incomes through a variety of services that often develop into microcredit, microinsurance, micro-savings, and money transfers according to **Van Rooyen et al. (2012).**

2.2 STUDIES RELATED TO GREEN MICROFINANCE AND SUSTAINABLE DEVELOPMENT

Ud Dowla (2004) observed the success of the microfinance programmes in Bangladesh, India, and Uganda as well as the Grameen micro leasing programme helps to highlight the fact that the poor have a variety of credit needs and that microfinance institutions (MFI) must offer products that are flexible and adaptive. **Khan (2014) and Julia et al. (2018)** examined the existence of green microfinance institutions for their financial and economic and ethical environmental practices. **Tunisian (2015) and Iqbal et al. (2019)** suggested that microfinance institutions must engage in their certain operation in a reasonable way and in appropriate settings to avoid global co2 emissions and internal carbon effects.

Shahidullah and Haque (2015) discussed issues related to environmental change, green building, restoration, waste management, sound pollution reduction, solar power installation on microfinance institutions' rooftops, and effective use of sustainable, non-renewable, human, and organic sources. the importance of green microfinance as a strategy for helping the poorest populations in any area or even nation by giving them flexible green loans to start and run companies. **Ahmed Khan (2016)** acknowledge the importance of green microfinance as a strategy for helping the poorest populations in any area or even nation by giving them flexible green loans to start and run companies. According to **Usman et al. (2016)** reducing the credit risk, legal liability, security risk, and reputational threat in the microfinance sector are crucial to green financing and refers to methods and procedures that help microfinance institution to be fiscally, environmentally, and socially responsible. **Julia (2016)** categorises funding green businesses as promoting investment expenditure in Biogas Plants, Renewable Power Plants, Liquid waste Treatment Plants, Bio-fertilizer Plants, etc. Green microfinance institutions try to take proactive steps to preserve the environment and further it is extended by **Nugroho et al. (2017) and Boubacar (2018), Nair and Njolomole (2020)** they conceptualized green microfinance as a distinction from microfinance would be that soft loans are given to people or organisations whose programmes encourage eco-friendly ecological and social development, create green jobs, and advance eco-solutions to issues that are endangering and damaging the environment. **Julia et al. (2018)** suggested that microfinance institutions should prioritise funding ecologically to support a reduction in carbon emissions. This eco-friendly microloan programme adheres to the environmental principle of recycling, resource reuse, and refining. **Julia et al. (2018) and Sachs et al. (2019)** examined that green microfinance does not hurt the environment; rather, it speeds up people-centred sustainable investment and ecological development that focuses on clean water, clean power, sectors, and infrastructure. It also addresses the issue of poverty and lowers atmospheric waste. It looks for revenue and appeals to environmental stability within businesses, resources, the atmosphere, and the community. Green microfinance, according to **Julia and Kassim (2018)** may raise marginal people's wages to ensure their survival, improve their standard of living, and preserve the environment. **Iqbal et al. (2019)** realised that green microfinance refers to environmentally friendly microfinance institutions to stop environmental deterioration and make the world more liveable and concludes that to achieve the

Sustainable Development Goals (SDGs) to end poverty and advance environmental progress, green social microfinance may play a crucial role. **Roy Mohanty (2020)** realised the significance of green microfinance for poor people with flexible green loans for environment conservation.

2.3 STUDIES RELATED TO GREEN MICROFINANCE AND SUSTAINABLE RURAL DEVELOPMENT

Long et al. (1994) stated that there is a consensus in the field of development studies that to achieve sustainable development in rural regions, actor groups, including scientists, must reconsider how they manage natural resources. **Marsden, et al. (2001)** argued that taking into account the possibilities of alternative and emerging rural development scenarios sociological theory and empirical practice must be reformulated. **Strigl (2003)** observed that rural development defined as institutional reform focusing towards "neo-liberalization" of villages. **Rist et al. (2007)** focused that the creatively apply the idea of sustainability to the future of rural areas. **Akgün, et al. (2015)** imagined several possibilities for those rural places that are thought to be potential hot spots and tried to understand from point of view of Sustainable rural development how the diversity of rural areas leads to their future being sustainable. **Yadav, et al. (2017**) presented a way for finding these conflicts which have zero-sum solutions. By turning these zero-sum issues into positive-sum ones, they created the perceived value that is a key component of sustainable rural development. The review of related literature attempts to map green microfinance with rural development but unfortunately very few studies focus on sustainable rural development through green microfinance. The following research gaps has been identified by after reviewing the related literature.

RESEARCH GAP

- Why Microfinance institutions decided to be environment friendly?
- What is the importance of the lowest third line of Profit, People, and Planet?
- Is there is any change in regulatory framework when microfinance becomes green?
- What are the synergies between Financial, Social and Environmental sustainability and green finance?

3. SIGNIFICANCE OF THE STUDY

The microfinance sector in recent years addressed the tierce bottom line along with its social and

financial objectives (Profit, people, and planet) by addressing financial inclusion, social mobility and environment protection (Arya and Christen 2004). This new thought process has then emerged as green microfinance that integrates sustainability in sound microfinance practices.

This new concept emerged as 'green microfinance' which is the integration of profit, people, and planet in all its sustainable practices. Green microfinance policies help to protect the environment and reduce poverty, which may have a favourable effect on how they work to achieve the SDGs. Consequently, green microfinance institution provides a gateway for resource distribution to thousands of underprivileged individuals, particularly women. The timely distribution of microloans assists women business owners in empowering themselves and providing for their families, which aids in the rural regions' sustainable development. The possibility of addressing widespread poverty, financial exclusion, and energy inequity exists with green microfinance. It has the potential to reduce the gap between those advocating for environmental reforms and those who are most negatively affected by it. Institutions that provide microfinance have an interest in promoting customer adaptation approaches. These green initiatives help rural peoples to mobilised their assets, as well as suggest threat coping apparatuses, while also disseminating knowledge and information to change customer behaviour toward more sustainable practises.

Therefore, the present research work is an attempt to create the linkages between Green Microfinance and Sustainable Rural Economy. The present study will be valuable for policy makers and government, for better governance and designing new policy addressing the bottom line for sustainable rural economy in Uttar Pradesh. The proposed farmwork of present study is shown in figure -3.

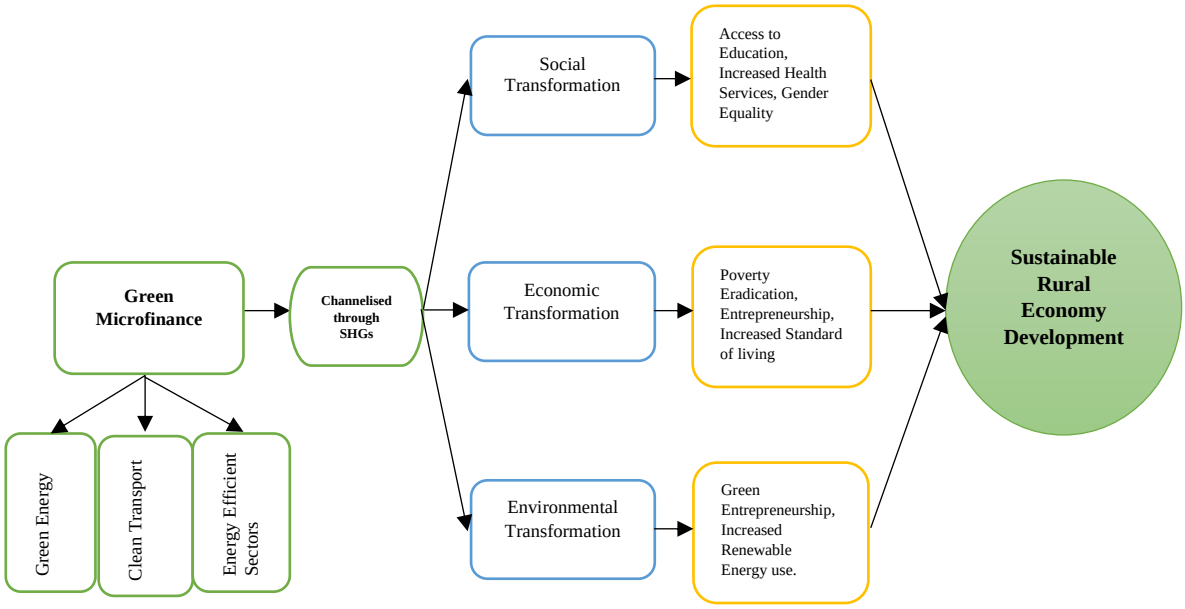

Fig. 3: Conceptual Framework of Green Microfinance and Sustainable Rural Economy

4. OBJECTIVES OF THE STUDY

The present study based on following objectives -

- To study the operational practices of microfinance institutions towards green microfinance.
- To Explore linkages between green microfinance and sustainable rural economy towards social, economic and environmental transformation.
- To identify the problems and challenges in the adoption of green microfinance.
- To propose an action plan for the successful implementation of green microfinance for achieving the sustainable development of a rural economy.

5. HYPOTHESES OF THE STUDY

H_0^1: There is no significant impact of Green Microfinance on a Sustainable Rural Economy.

$H_0{}^1{}_a$: There is no significant impact of green microfinance for green initiatives in creating social transformation in the Sustainable rural Economy.

$H_0{}^1{}_a{}^{1-}$ There is no significant impact of access to education in creating social transformation on a Sustainable rural Economy.

$H_0{}^1{}_a{}^{2-}$ There is no significant impact of increased health services in creating social transformation on a Sustainable rural Economy.

$H_0{}^1{}_a{}^{3-}$ There is no significant impact of Gender Equality in creating social transformation on a

Sustainable rural Economy.

$H_0{}^1{}_b$: There is no significant impact of green microfinance for green initiatives in creating Economic transformation in a Sustainable rural Economy.

$H_0{}^1{}_b{}^{1-}$ There is no significant impact of Poverty Eradication in creating Economic transformation on a Sustainable rural Economy.

$H_0{}^1{}_b{}^{2-}$ There is no significant impact of Entrepreneurship in creating Economic transformation on a Sustainable rural Economy.

$H_0{}^1{}_b{}^{3-}$ There is no significant impact of increased Standard of Living in creating Economic transformation on a Sustainable rural Economy.

$H_0{}^1{}_c$: There is no significant impact of green microfinance for green initiatives in creating Environmental transformation on Sustainable rural Economy.

$H_0{}^1{}_c{}^{1-}$ There is no significant impact of green entrepreneurship in creating Environmental transformation on a Sustainable rural Economy.

$H_0{}^1{}_c{}^{2-}$ There is no significant impact of increased renewable energy in creating Environmental transformation on a Sustainable rural Economy.

$H_0{}^2$: There is no significant impact of Financial Cognition on a Sustainable Rural Economy.

6. RESEARCH METHODOLOGY

The study efforts to analyze the impact of green microfinance for attainment of a sustainable rural economy. The entire assessment is basically based on primary and secondary data. The potential contribution of green microfinance will be measured through group discussions, observations and analyzing the respondent's degree of agreement on structured questionnaire.

Study type: Descriptive and Analytical

6.1 Variables of the Study

- *Independent variable*: Green Microfinance and Financial Cognition
- *Dependent variables*: Social, Economic and environmental transformation of the rural economy.

6.2 Sources of data

- **Primary**: The primary data will be collected through structured questionnaires and interviews

of rural beneficiaries of self-help groups .

- **Secondary**: The secondary data will be collected through policy documents, yearly reports of microfinance, research articles, visiting websites, magazines, research papers, journals, books, newspaper etc.

6.3 Locale of the Study

- According to NITI Aayog's Multidimensional Poverty Index (MPI) released in 2021, Uttar Pradesh has emerged as one of the poorest states in India.
- In the same report Agra had a poverty ratio of 33.59%.
- The Agra district (Uttar Pradesh) has been well-thought-out as the study area for the present research work.
- The district consists of Six Tehsil and Fifteen Blocks, namely, Etmadpur, Khandauli, Shamshabad, Fatehabad, Jagner, Kheragarh, Saiyan, Achanera, Akola, Bichpuri, Fatehpur Sikri, Barauli Ahir, Bah, Pinahat and Jaitpur Kalan.

6.4 Size of the Sample

The calculated sample is **374 SHGs**. (Sample calculation is attached in Annexure II)

Total Blocks in Agra District- 15

Total number of SHGs in Agra District- 13,779 (Block wise list attached in Annexure-III)

6.5 Sampling Method: Purposive and Stratified Random Sampling

The Uttar Pradesh will be selected purposely and the Self-help Groups of 15 Blocks of Agra District will select as strata for the present study and villages of each block will be selected randomly.

6.6 Statistical tools: The descriptive and inferential statistical tools will be used for analyzing data:

- Correlation analysis (Pearson's) and Multivariate Regression analysis
- Structural equation modelling (SEM)
- Likert scale
- One-way ANOVA
- Factor Analysis

6.7 Applications: MS-Excel, SPSS-20

7. PROPOSED CHAPTERS

Chapter 1: Introduction

Chapter 2: Review of Literature

Chapter 3: Research Methodology

Chapter 4: Green Microfinance: An Overview of India

Chapter 5: Linkage between Green Microfinance and Sustainable development

Chapter 6: Linkage between Green Microfinance and the Rural Economy

Chapter 7: Conclusion & Recommendations

REFERENCES

1. Allet, M. (2014). "Why Do Microfinance Institutions Go Green? An Exploratory Study", J Bus Ethics 122, 405–424. https://doi.org/10.1007/s10551-013-1767-2
2. Ahmed, K., & Khan, R. (2016). "Disclosure practices and governance quality: Evidence from microfinance institutions", Journal of Accounting and Organizational Change, 12(3), 325–350. https://doi.org/10.1108/JAOC-02-2015-0014
3. Akgün, A. A., Baycan, T., & Nijkamp, P. (2015). "Rethinking sustainable rural development", European Planning Studies, 23(4), 678-692.
4. Araya, M.C. & Christen, R.P. (2004). "Microfinance as a tool to protect biodiversity hotspots", Washington DC: CGAP.
5. Asian Development Bank (2022). "Microenterprise Development: Not by Credit Alone", Asian Development Bank (ADB), Manila, 1997. Available online: http://www.adb.org/Documents/Books/Microenterprise/microenterprise.pdf (accessed on 15 December).
6. Bhanot, D., Bapat, V., (2015). "Sustainability index of microfinance institutions (MFIs) and contributory factors", Int. J. Soc. Econ. 42 (4), 387e403.
7. Bonomo, L., & Kirchstein, K. (2010). "Microfinance Plus–Why does it matter and how can it be approached?", About the UMM workshop and this publication. In 4th University Meets Microfinance Workshop, University of Bergamo, Italy (Vol. 22).
8. Boubacar, H. (2018). "Internal governance mechanisms and the performance of decentralized

financial systems in Niger", International Journal of Social Economics, 45(4), 629–643. https://doi.org/10.1108/IJSE-11-2016-0342

9. Chowdhury, I.A. (2005). "Why a Year: Quote Collection", Year-of-Micro-credit.org, http://www.yearofMicro-credit.org/pages/whyayear/whyayear_quotecollection.asp# Stanley Fischer.
10. Copestake, J. (2007). "Mainstreaming Microfinance: Social Performance Management or Mission Drift?", World Development 35(10)
11. García-Pérez, I., Muñoz-Torres, M. J., & Fernández-Izquierdo, M. Á. (2017). "Microfinance literature: A sustainability level perspective survey", Journal of Cleaner Production, 142, 3382-3395.
12. Hall, J, Collins, L., Israel, E. & Wenner, M. (2008). "The missing bottom line: Microfinance and the Environment", Philadelphia: GreenMicrofinance-LLC
13. Hashemi, S. M., Schuler, S. R., & Riley, A. P. (1996). "Rural credit programs and women's empowerment in Bangladesh", World development, *24*(4), 635-653.
14. Imran, M., Haq, S. U., & Ozcatalbas, O. (2022). "Role of Microcredit in Sustainable Rural Development", In (Ed.), Sustainable Rural Development Perspective and Global Challenges, Intech Open. https://doi.org/10.5772/intechopen.102588
15. Iqbal, S., Nawaz, A., & Ehsan, S. (2019). "Financial performance and corporate governance in microfinance: Evidence from Asia", Journal of Asian Economics, 60, 1–13. https://doi.org/10.1016/j.asieco.2018.10.002
16. Julia, T., Kassim, S., & Adawiah, E. R. (2018). "Green Business Sustainability and Shariah Compliance in Bangladesh Context", 17th Kuala Lumpur International Business, Economics and Law Conference, (October), 308–326.
17. Julia, T., Kassim, S., & Ali, E. R. A. E. (2018). "Are the Green Projects in Line with the Maqasid Shariah?", An Assessment of Green Firms in Bangladesh. The Global Conference on Islamic Economics and Finance 2018, (October), 317–335
18. Kantor P. 2002. "Female mobility in India: the influence of seclusion norms on economic outcomes", Int. Dev. Plan. Rev. 24(2): 145–59

19. Khan, M. M. (2014). “An assessment of the green microcredit projects in Bangladesh: livelihood and environmental sustainability”, University of Manitoba (Canada).
20. Kreft, S., Eckstein, D., Junghans, L. Kerestan, C., & Hagen, U. (2014). “Global climate risk index 2015”, Who suffers most from extreme weather events? Weather-related loss events in 2013 and 1994 to 2013. Bonn: German watch.
21. Long, N., Villareal, M., (1994). “The interweaving of knowledge and power in development Interfaces”, In: Scoones, I., Thompson, J. (Eds.), Beyond Farmers First—Rural People’s Knowledge, Agricultural Research and Extension Practice. Intermediate Technology Publications, London, pp. 41–51.
22. Littlefield, E., Morduch, J. and Hashemi, S. (2003). “Is microfinance an effective strategy to reach the millennium development goals?”, CGAP Focus Note 24, January, www.cgap.org/docs/FocusNote_24.pdf.
23. Marsden, T., Banks, J., Renting, H., & Van Der Ploeg, J. D. (2001). “The road towards sustainable rural development: issues of theory, policy and research practice”, Journal of Environmental Policy & Planning, 3(2), 75-83.
24. Martinot, E. (2005) Renewables (2005). “Global Status Report”, The World watch Institute, p.30.
25. Muhammad Imran, Shamsheer Ul Haq and Orhan Ozcatalbas (2022). “Role of Microcredit in Sustainable Rural Development”; May 14th, DOI: 10.5772/intechopen.102588
26. Nair, M., & Njolomole, M. (2020). “Microfinance, entrepreneurship and institutional quality”. Journal of Entrepreneurship and Public Policy, ahead-of-p(ahead-of-print). https://doi.org/10.1108/JEPP-07-2019-0061
27. Nugroho, L., Utami, W., Akbar, T., & Arafah, W. (2017). “The challenges of microfinance institutions in empowering micro and small entrepreneurs to implement the green activity”, International Journal of Energy Economics and Policy, 7(3), 66–73. https://doi.org/http: www.econjournals.com International
28. Rahman, R. I. (1996). “Impact of Grameen Krishi Foundation on the socioeconomic condition of rural households”, (Working Paper No. 7). Dhaka, Bangladesh: BIDS
29. Ramaswamy, A., & Krishnamoorthy, A. (2016). “The Nexus between Microfinance & Sustainable

Development: Examining the regulatory changes needed for its efficient implementation", European Journal of Sustainable Development, 5(3), 453-453.

30. Rist, S., Chidambaranathan, M., Escobar, C., Wiesmann, U., & Zimmermann, A. (2007). "Moving from sustainable management to sustainable governance of natural resources: The role of social learning processes in rural India", Bolivia and Mali. Journal of rural studies, 23(1), 23-37.
31. Roy, S., & Mohanty, R. P. (2020). "Microfinance models in improving "quality of life": Empirical analysis on Indian perspective". International Journal of Business Innovation and Research, 21(1), 23–55. https://doi.org/10.1504/IJBIR.2020.104031
32. Ruben, R. and Clercx, L. (2003). "Rural finance, poverty alleviation, and sustainable land use: The role of credit for the adoption of agroforestry systems in occidental Honduras", Journal of Microfinance, Vol. 5, No. 2, Winter, pp.77–100.
33. Sachs, J. D., Woo, W. T., Yoshino, N., & Taghizadeh-Hesary, F. (2019). "Importance of Green Finance for Achieving Sustainable Development Goals and Energy Security", Handbook of Green Finance, 3–12. https://doi.org/10.1007/978-981-13-0227-5_13
34. Shahidullah, A. K. M., & Haque, C. E. (2015). "Green microfinance strategy for entrepreneurial transformation: Validating a pattern towards sustainability". *Enterprise Development & Microfinance*, *26*(4), 325-342.
35. Srinivasan, Sunderasan (2007). "Microfinance for Renewable Energy: financing the 'former poor'", World Review of Entrepreneurship, Management and Sustainable Development, 3(1), 79–. doi:10.1504/wremsd.2007.012132
36. Strigl, A., (2003). "Science, research, knowledge and capacity building", Environ. Dev. Sustainability 5, 255–273.
37. Temple, F.T. (2000). "Incorporation of renewable energy technology in development projects", World Bank, 18th November
38. Tunisan, E. D. (2015). "The role of Islamic Microfinance in Poverty Alleviation: Lessons from Bangladesh Experience", Humanomics, 31(67323), 1–18. https://doi.org/10.1108/17538391111144515
39. Uddin, M. S. (2011). "Microcredit and community-based organizations: An analysis of the role,

challenges and learning in hakaluki haor", Bangladesh (Unpublished master's thesis). Natural Resources Institute, University of Manitoba, Winnipeg, MB, Canada

40. Ud Dowla, A. (2004). "Micro leasing: the grameen bank experience", Journal of Microfinance, Vol. 6, No. 2, Winter, pp.137–160
41. UN (2022), Stockholm+50, https://www.stockholm50.global/.
42. Usman, S., Tasmin, R., Tun, U., & Onn, H. (2016). The Relevance of Islamic Micro-finance in achieving the Sustainable Development Goals. International Journal of Latest Trends in Finance & Economic Sciences IJLTFES,6(August).
43. Van Rooyen, C., Stewart, R., de Wet, T., 2012. "The impact of microfinance in Sub-Saharan Africa: a systematic review of the evidence". World Dev. 40 (11), 2249e2262.
44. Wenner, M.D., Wright, N. and Lal, A. (2004). "Environmental protection and microenterprise development in the developing world: a model based on the Latin American experience", Journal of Microfinance, Vol. 6, No. 1, Summer, pp.95–112
45. Yadav, A., Das, A. K., Roy, R. B., Chatterjee, A., Allen, J. K., & Mistree, F. (2017). "Identifying and managing dilemmas for sustainable development of rural India", In International design engineering technical conferences and computers and information in engineering conference (Vol. 58219, p. V007T06A017). American Society of Mechanical Engineers.

Bibliography

1. Asian Development Bank (ADB) http://www.adb.org/Microfinance/default.asp.
2. Cabinet approves India's updated nationally determined contribution to be communicated to the United Nations Framework Convention on Climate Change. Press Information Bureau. (n.d.). Retrieved November 30, 2022, from https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1847812
3. Government of India Ministry of New and Renewable Energy Women ... - MNRE. (n.d.). Retrieved December 22, 2022, from https://mnre.gov.in/img/documents/uploads/file_f-1625203164573.pdf
4. http://microfinancegateway.org/resource_centers/reg_sup/micro_reg/country/19/.
5. https://unesdoc.unesco.org/ark:/48223/pf0000111669.locale=en
6. Best Renewable Energy Stocks in India: Reasons to invest in them. INDMoney. (n.d.). Retrieved

November 30, 2022, from https://www.indmoney.com/articles/stocks/top-renewable-energy-stocks-in-india

7. Guest. (2021). “Making India a hub of sustainability financing”, The Financial Express. Retrieved November 29, 2022, from https://www.financialexpress.com/opinion/making-india-a-hub-of-sustainability-financing/2381551/
8. OECD (2019). “Access to Green Finance for SMEs in Georgia”, Green Finance and Investment, OECD Publishing, Paris, https://doi.org/10.1787/dc98f97b-en.

Reports

- National Rural Livelihood Mission
- Status of Microfinance in India 2021-22
- RBI Bulletin
- Sustainable Development Goals Report 2022

ANNEXURE- I

Review of Literature Summary Sheet

Author	Year	Source	Microfinance	Green Microfinance	Rural Development	Sustainable Development
Akgün	**2015**	European Planning Studies			✓	✓
Bonomo and Kirchstein	**2010**	University Meets Microfinance Workshop	✓			✓
Boubacar	**2018**	International Journal of Social Economics		✓		✓
Chowdhury	**2005**	Why a Year: Quote Collection	✓		✓	
Hashemi	**1996**	World development	✓			
Iqbal	**2019**	Journal of Asian Economics	✓	✓		✓
Julia	**2016**	Economics and Law Conference		✓		
Julia	**2018**	The Global Conference on Islamic Economics and Finance		✓		
Julia and Kassim	**2018**	The Global Conference on Islamic Economics and Finance		✓		
Khan	**2014**	University of Manitoba		✓		
Khan	**2016**	Journal of Accounting and Organizational Change		✓	✓	
Littlefield	**2003**	CGAP Focus Note	✓			
Long and Villareal	**1994**	Intermediate Technology Publications			✓	✓
Marsden	**2001**	Journal of Environmental Policy & Planning			✓	✓
Microcredit Summit	**1996**				✓	
Nair and Njolomole	**2020**	Journal of Entrepreneurship and Public Policy	✓	✓		✓
Nugroho	**2017**	. International Journal of Energy		✓		✓

		Economics and Policy				
Rahman	**1996**		✓			
Rist et al	**2007**	Journal of rural studies			✓	✓
Roy	**2020**	International Journal of Business Innovation and Research		✓	✓	
Ruben and Clercx	**2003**	Journal of Microfinance	✓		✓	
Sachs	**2019**	Handbook of Green Finance		✓		✓
Shahidullah and Haque	**2015**	Enterprise Development & Microfinance	✓			✓
Strigl	**2003**	Environment, Development and Sustainability			✓	✓
Tunisian	**2015**	Humanomics	✓			✓
Uddin	**2011**	Natural Resources Institute, University of Manitoba	✓		✓	
Ud Dowla	**2004**	Journal of Microfinance	✓		✓	
Usman	**2016**	International Journal of Latest Trends in Finance & Economic Sciences		✓		✓
Van Rooyen	**2012**	World development	✓			
Yadav	**2017**	International design engineering technical conferences and computers and information in engineering conference			✓	✓

ANNEXURE- II

Sample Size Calculation

Number of SHGs in Agra District- 13,779

Confidence Level	95%
Margin of Error	5%
Population Proportion	50%
Population Size	13779
Suggested sample size	**374**

Sample size= $\frac{\frac{z^2 \times p(1-p)}{e^2}}{1+\left(\frac{z^2 \times p(1-p)}{e^2 N}\right)}$

Calculated Sample Size= 374 Self-help Groups

ANNEXURE- III

Block wise total number of Self-Help Groups in Agra District

Blocks	**Total SHGs**
Achhnera	946
Akola	791
Bah	954
Barauli Ahir	1,429
Bichpuri	717
Etmadpur	741
Fatehabad	1,115
Fatehpur Sikri	936
Jagger	563
Jaitpur Kalan	732
Khandauli	1,035
Kheragarh	651
Pinahat	709
Sainyan	896
Shamsabad	1,564
Total	**13,779**

Source: NRLM (National Rural Livelihood Mission)